...ay, 11/24/2005 1:39:25 PM
Linda Lacelle

# Process Sheet

Split -1

| | | | |
|---|---|---|---|
| **Customer** | : CU-DAR001 Dart Helicopters Services | **Drawing Name** | : FWD TUBE ASSEMBLY |
| **Job Number** | : 24865 | | |
| **Estimate Number** | : 10467 | | |
| **P.O. Number** | : N/A | **Part Number** | : D3391021 |
| **This Issue** | : 11/24/2005 **S.O. No.** : N/A | **Drawing Number** | : D3391 ~~REV B~~ Rev D AH 06.03.28 |
| **Prsht Rev.** | : NC | **Project Number** | : N/A |
| **First Issue** | : N/A **Type** : MACHINED PARTS | **Drawing Revision** | : B |
| **Previous Run** | : 24865 | **Material** | : N/A |
| **Written By** | : SEE COMMENT BELOW | **Due Date** | : 12/20/2005 **Qty:** 5 **Um:** Each |
| **Checked & Approved By** | : SEE ABOVE USER & DATE | | |
| **Comment** | : Est. A 05.09.13 New issue KJ/JLM | | |

**Additional Product**

Job Number:

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 1.0 | D6013047 | SKIDTUBE MAT'L |

**Comment:** Qty.: 1.0000 Each(s)/Unit Total : 5.0000 Each(s)
SKIDTUBE MAT'L
Pick:

| Qty | Part Number | Description | Batch |
|---|---|---|---|
| 1 | D6013-047 | Extrusion | 323935 |

ml 05/11/28 5

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 2.0 | ~~LANDING GEAR~~ 1 Band saw | LANDING GEAR RESOURCE 1 |

**Comment:** ~~LANDING GEAR RESOURCE 1~~ Bandsaw
Cut extrusion to 46.52 +0.010 -0.020

ml 05/11/28 5

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 3.0 | BRAKE NC | NC BRAKE |

**Comment:** NC BRAKE
Bend as per Dwg D3391

DP 05-12-15 (10)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 4.0 | QC5 | INSPECT WORK TO CURRENT STEP |

**Comment:** INSPECT WORK TO CURRENT STEP

05-12-23 10 (PTO)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 5.0 | HAAS1 | HAAS CNC VERTICAL MACHINING #1 |

**Comment:** HAAS CNC VERTICAL MACHINING #1
1-Machine as per Folio FA590 Rev. C & Dwg D3391 Rev. C
Identify as D3391-1

2-Deburr

SA 06.01.05 9 (PTO)

# Process Sheet

**Customer:** CU-DAR001 Dart Helicopters Services  **Drawing Name:** FWD TUBE ASSEMBLY

**Job Number:** 24865  **Part Number:** D3391021

Job Number:

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 6.0 | QC2 | INSPECT PARTS AS THEY COME OFF MACHINE |

**Comment:** INSPECT PARTS AS THEY COME OFF MACHINE  SA 06.01.05 (10)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 7.0 | QC8 | SECOND CHECK |

06.03.28 (3)

**Comment:** SECOND CHECK

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 8.0 | LANDING GEAR 1 | LANDING GEAR RESOURCE 1 |

**Comment:** LANDING GEAR RESOURCE 1
Drill and c'sink float bag holes as per Dwg D3391 using DT8798 DP 06-1-7 (2)
Drill wearplate holes as per Dwg D3391 DP 06-1-7 (2)
Deburr DP 06-1-7 (2)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 9.0 | HAND FINISHING1 | HAND FINISHING RESOURCE #1 |

**Comment:** HAND FINISHING RESOURCE #1
Acid etch and Alodine as per QSI 005 4.1 DP 06-1-7 (2)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 10.0 | POWDER COATING | POWDER COATING |

**Comment:** POWDER COATING
Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3  A. M 06-04-05 (1)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 11.0 | QC3 | INSPECT POWDER COAT/CHEMICAL CONVERSION |

**Comment:** INSPECT POWDER COAT/CHEMICAL CONVERSION  DL 06/04/05 (1)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 12.0 | D3401041 | Tow Cap Assembly |

**Comment:** Qty.: 1.0000 Each(s)/Unit Total : 5.0000 Each(s)
Tow Cap Assembly
Pick:

| Qty | Part Number | Description | Batch |
|---|---|---|---|
| 1 | D3401-041 | Tow Cap | B25548 |

FC 06/04/05 (1)

| Seq. #: | Machine Or Operation: | Description : |
|---|---|---|
| 13.0 | AN3C4A | Bolt |

**Comment:** Qty.: 4.0000 Each(s)/Unit Total : 20.0000 Each(s)
Bolt
Pick:

Split  PTO

**Dart Aerospace Ltd**

| W/O: | | WORK ORDER CHANGES | | | | | |
|---|---|---|---|---|---|---|---|
| **DATE** | **STEP** | **PROCEDURE CHANGE** | **By** | **Date** | **Qty** | **Approval** Chief Eng / Prod Mgr | **Approval** QC Inspector |
| | | | | | | | |
| | | | | | | | |

**Part No:** D2391-021 **PAR #:** N/A **Fault Category:** Prod / machined parts **NCR:** (Yes) No **DQA:** [initials] **Date:** 06/04/12

**QA: N/C Closed:** ____ **Date:** ____

| NCR: 2485 | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Corrective Action** Section B | | | | | |
| **DATE** | **STEP** | **Description of NC** Section A | **Initial** Chief Eng | **Action Description** Chief Eng | **Sign & Date** | **Verification** Section C | **Approval** Chief Eng | **Approval** QC Inspector |
| 06.01.05 | 4 | 1 tube is a ½" too long. | [initials] 06Feb? | Cut ½" off machined end, before machining. cut → SD 06.01.06 | SD 06.03.28 | [signature] 06.03.28 | [signature] 06Feb? | [signature] 06.01.05 |
| 06.01.06. | 5 | 1 tube moved while machining (scrap) Slipped in vise while cutting out 1.429 (detail c-c) | [initials] 06Jan? | Scrap and destroy. | SD 06.01.06 | [signature] 06.03.28 | [signature] 06Jan? | [signature] 06.03.28 |
| 06.03.28 | 5 | 1 tube scrap. (see (sec B-D). Dim is 3.550 top to bottom, but mat'l thickness on bottom slot (.687) is .006. unacceptable. | [initials] 06Mar? | scrap & destroy | SA 06.03.28 | [signature] 06.03.28 | [signature] 06Mar? | [signature] 06.03.2[illegible] |

**NOTE:** Date & initial all entries

H:\fFORMS\Quality Assurance\approved QA\NCRWO RevD

# Process Sheet

**Customer:** CU-DAR001 Dart Helicopters Services **Drawing Name:** FWD TUBE ASSEMBLY

**Job Number:** 24865 **Part Number:** D3391021

Job Number:

| Seq. #: | Machine Or Operation: | Description : | |
|---|---|---|---|
| | Qty 4 / Part Number AN3C4A / Description Bolt / Batch m19413 | | FC 06 04 05 ① |
| 14.0 | NAS1330C3KB166 | Rivnut | |
| | Comment: Qty.: 24.0000 Each(s)/Unit Total : 120.0000 Each(s)<br>Rivnut<br>Pick:<br>Qty 24 / Part Number NAS1330C3KB166 / Description Insert / Batch m 18308 | | FC 06 04 09 ① |
| 15.0 | NAS1515H3 | Washer | |
| | Comment: Qty.: 4.0000 Each(s)/Unit Total : 20.0000 Each(s)<br>Washer<br>Pick:<br>Qty 4 / Part Number NAS1515H3 / Description Washer / Batch m19633 | | FC 06 04 05 ① |
| 16.0 | SMALL FAB 1 | SMALL & MEDIUM FAB RESOURCE 1 | |
| | Comment: SMALL & MEDIUM FAB RESOURCE 1<br>Install inserts and Tow Cap as per Dwg D3391<br>Identify as D3391-021 | | FC 06.04 10 ① |
| 17.0 | QC5 | INSPECT WORK TO CURRENT STEP | |
| | Comment: INSPECT WORK TO CURRENT STEP | | 06 04 11 ① |
| 18.0 | PACKAGING 1 | PACKAGING RESOURCE #1 | |
| | Comment: PACKAGING RESOURCE #1<br>Identify and Stock<br>Location:_______ | | N/A |
| 19.0 | DC | DOCUMENT CONTROL | |
| | Comment: DOCUMENT CONTROL<br>Inspection Level 21 | | 06.04.12 ① |

Job Completion 06.04.12

Dart Aerospace Ltd

| W/O: | | WORK ORDER CHANGES | | | | | |
|---|---|---|---|---|---|---|---|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

**Part No:** ______ **PAR #:** ______ **Fault Category:** ______ **NCR:** Yes No **DQA:** ____ **Date:** ______

**QA: N/C Closed:** ____ **Date:** ______

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DATE | STEP | Description of NC Section A | Corrective Action Section B: Initial Chief Eng | Action Description Chief Eng | Sign & Date | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| 06/01/17 | 5 ? | 1. the dim. 3.580 was 3.566 dim 3.300 was 3.273 dim 1.429 was 1.400 | | | SD | | | |
| | ✓ * | 2. the dim 3.580 was 3.595 dim 1.429 was 1.390 ~~dim 4.250 was 4.280~~ | [signature] | Acceptable, see e-mail | | 05-01-18 | [signature] | 06-01-18 |
| 06/01/17 | 5 ? | ~~3. the dim 3.300 was 3.282 dim 3.580 was 3.556 dim 4.250 was 4.280~~ | | | SD | | | |
| | ✓ | 4. the dim 1.429 was 1.390 ~~dim 3.580 was~~ 3.605 ~~dim 4.250 was 4.280~~ | [signature] | Acceptable, see e-mail | | 06-01-18 | [signature] | 06-01-18 |
| 06/01/17 | 5 ? | 5. the dim 3.300 was 3.320 dim 1.429 was 1.405 dim 3.580 was 3.626 ~~dim 4.250 was 4.280~~ | | | SD | | | |

**NOTE:** Date & initial all entries

3.300 is 3.282
3.580 is 3.556

H:\fFORMS\Quality Assurance\approved QA\NCRWO RevD

2 and 4 ok [initials] 06.01.17

Job Costing Report

Dart Aerospace Ltd. Nov 17, 2005
Hawkesbury 03:30 pm

| | | | |
|---|---|---|---|
| Work Order No | : 0024865 | | |
| Project Name | : D3391-021 | Department Code: | |
| Project For | : WK550 | Burden Flags | : NNNNNNN |
| Work Order Type | : Main | WO Status | : Open |
| Main WO Number | : | Invoice State | : Not Invoiced |
| House Part Number | : D3391-021 | Invoice Date | : |
| Description | : Fwd Tube Assembly | Invoice Number | : |
| Manufactured | : Yes | Invoice Amount | : 0.00 |
| Amount Req'd | : 5 | | |
| Amount Done | : 0 | Order Entry No | : |
| Start Date | : 11-17-05 | OE Value | : 0.00 |
| Est Finish Date | : 12-20-05 | | |
| Act Finish Date | : | Est Margin | : 0.000% |
| Drawings Reqd | : No | Actual Margin | : 0.000% |
| Ok for Approval | : | | |
| Approval Rec'd | : | $0 Posted to Finished Goods | |

| | Estimated | Actual | Var. % | Posted | To Post |
|---|---|---|---|---|---|
| Material Cost : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Engineering Hours : | 0.00 | 0.00 | 0.00 | | |
| Engineering Cost : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Production Hours : | 0.00 | 0.00 | 0.00 | | |
| Production Cost : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Packaging Hours : | 0.00 | 0.00 | 0.00 | | |
| Packaging Cost : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| OverHead Hours : | 0.00 | 0.00 | 0.00 | | |
| OverHead Cost : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CNC Hours : | 0.00 | 0.00 | 0.00 | | |
| CNC : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Misc. Hours : | 0.00 | 0.00 | 0.00 | | |
| Misc. : | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Burden : | 0.00 | 0.00 | 0.00 | | |
| Total Cost : | 0.00 | 0.00 | 0.00 | | |
| Margin : | 0.000 | 0.000 | | | |
| Selling Cost : | 0.00 | 0.00 | | | |

| | Estimated | Actual |
|---|---|---|
| Labour Hrs/Amount Done : | 0.00 | 0.00 |
| Profits/(Loss) : | 0.00 | 0.00 |

**Peter Hum**

**From:** David Shepherd [davids@dartaero.com]
**Sent:** Tuesday, January 03, 2006 9:58 AM
**To:** Peter Hum
**Cc:** Bill Beckett
**Subject:** Re: 412 float skidtube extension saddle holes

I think this is acceptable.

David

----- Original Message -----
From: "Peter Hum" <phum@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Cc: "Bill Beckett (E-mail)" <billb@dartaero.com>
Sent: Tuesday, January 03, 2006 7:03 AM
Subject: 412 float skidtube extension saddle holes

> Hi David,
>
> Bill and I recently opened up an aft tube extension saddle holes to 0.454
> diameter. The outer tube (6061), saddles, and bushings have remained the
> same size.
>
> Opening the holes allowed better fit for the bushings and bolts to slide
> through.
>
> Its important to remember that we haven't changed the size of the holes of
> the saddle, outer tube (6061), and diameter of the bushings. Therefore,
> under prepared landing surface conditions, the bearing loads have not
> changed in comparison to our standard D205-634 non-float 205 skidtube.
>
> David, I am looking for your approval to open the fwd and aft tube
extension
> saddle and ground handling holes to 0.454 in diameter.
>
> Thanks
>
> Peter
>
>

**Peter Hum**

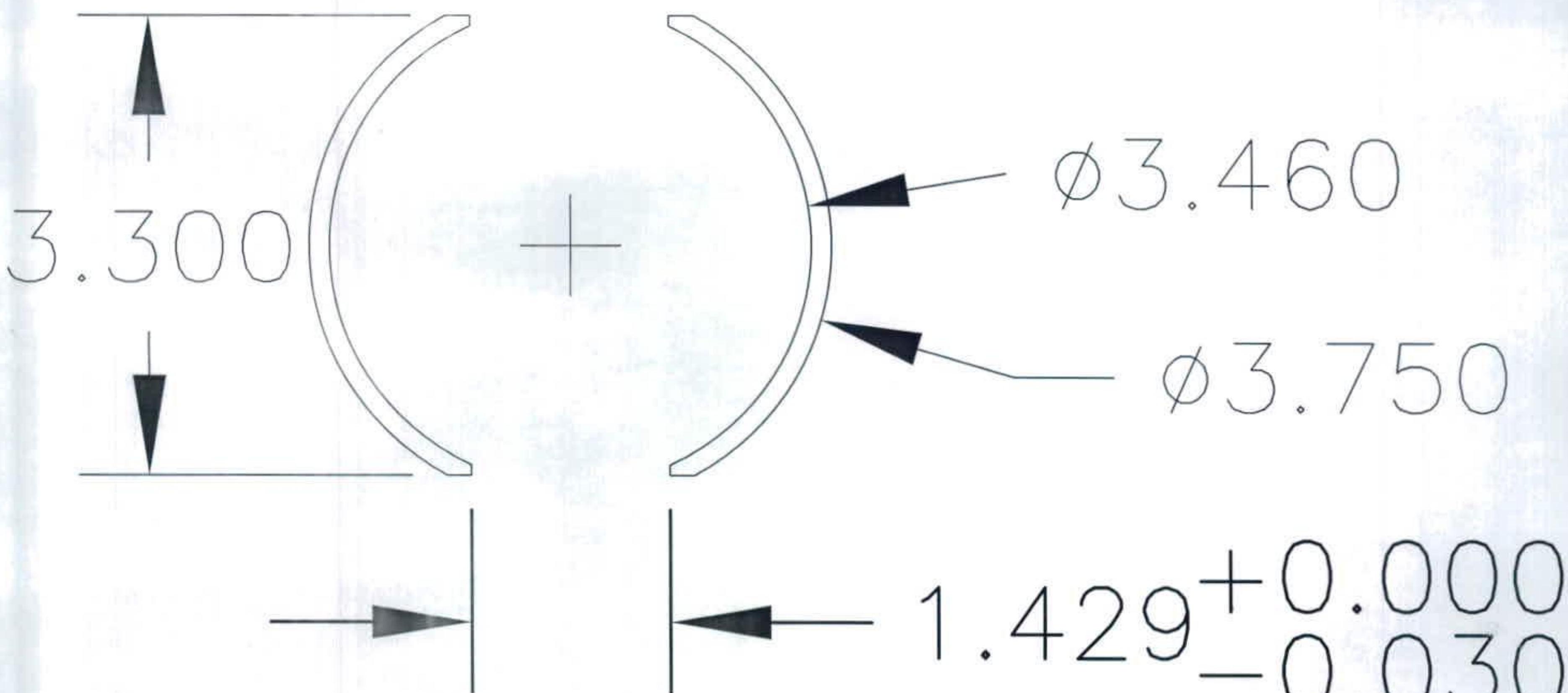
**From:** David Shepherd [davids@dartaero.com]
**Sent:** Thursday, January 05, 2006 2:58 PM
**To:** Peter Hum
**Subject:** Re: D412-742 fwd tube tolerance change

This is an acceptable deviation.

David

----- Original Message -----
From: "Peter Hum" <phum@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Sent: Thursday, January 05, 2006 12:13 PM
Subject: D412-742 fwd tube tolerance change

> Hi David,
>
> Is it acceptable to change the tolerance of the large slot that
> accommondates the I-beam in the fwd tube to (+0.000,-0.030)? If the
> dimension is at the lower limit, this will in fact strengthen the part.
>
> I've attached at sketch to show which dimension is changing
>
> Peter Hum
> Mechanical Designer
>
> DART Aerospace Ltd.
> Email...phum@dartaero.com
> Phone...613-632-3336
> Fax.......613-632-4443
>
>


3.300
ø3.460
ø3.750
1.429 +0.000 −0.030

| [illegible]EROSPACE LTD | Work Order: | 24865 |
|---|---|---|
| Description: Fwd Tube | Part Number: | D3391-021 |
| Inspection Dwg: Rev: | | Page 1 of 1 |

# FIRST ARTICLE INSPECTION CHECKLIST

☑ First Article ☐ Prototype

| Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|---|---|---|---|---|---|---|
| 7.000 | | 7.000 | ✓ | | | |
| 5.250 | | 5.250 | ✓ | | | |
| 1.750 | | 1.749 | ✓ | | | |
| 1.500 | | 1.500 | ✓ | | | |
| Ø .454 | | .454 | ✓ | | | |
| R.063 | | R.063 | ✓ | | | |
| | | | | | | |
| 3.750 | | 3.753 | ✓ | | | |
| 3.460 | | 3.462 | ✓ | | | |
| .687 | +.000 -.000 | .688 | ✓ | | | |
| 3.580 | | 3.573 | ✓ | | | |
| R .031 | | R.031 | ✓ | | | |
| | | | | | | |
| 3.300 | | 3.299 | ✓ | | | |
| 1.429 | +.000 -.030 | 1.427 | ✓ | | | |
| | | | | | | |
| 4.250 | | 4.249 | ✓ | | | |
| 4.250 | | 4.252 | ✓ | | | |
| R.188 | | R.188 | ✓ | | | |
| R.187 | | R.188 | ✓ | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Measured by: | SD | Audited by: | | Prototype Approval: | |
|---|---|---|---|---|---|
| Date: | 06.01.05 | Date: | | Date: | |

| Rev | Date | Change | Revised by | Approved |
|---|---|---|---|---|
| A | | New Issue | KJ/RF | |

**From:** David Shepherd [davids@dartaero.com]
**Sent:** Tuesday, January 17, 2006 3:15 PM
**To:** Peter Hum
**Subject:** Re: D3391-1 FWD TUBE DEVIATIONS

Assuming that this part fits with the middle tube it mates with, the
deviations listed below are acceptable.

David

----- Original Message -----
From: "Peter Hum" <phum@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Sent: Tuesday, January 17, 2006 1:04 PM
Subject: D3391-1 FWD TUBE DEVIATIONS

> David,
>
> In manufacturing the fwd tube, there have been tubes that are out of
> tolerance. The dimension 3.580" is actually 3.595" and the 1.429"
dimension
> is 1.390" as shown in the attached sketch. The tolerance of the 1.429"
> dimension was previously changed to (+0.000,-0.030). In both dimensions,
the
> end result is more material. Are these deviations acceptable?
>
> Peter Hum
> Mechanical Designer
>
> DART Aerospace Ltd.
> Email...phum@dartaero.com
> Phone...613-632-3336
> Fax.......613-632-4443
>
>